

## Biome-specific rodent dynamics and hantavirus epidemiologies in Europe

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Among emerging diseases, rodent-borne (robo) viral infections provide a prime example. In Europe, the incidence is increasing and more countries report robo infections. In the large collaborative EU project EDEN (Emerging Diseases in a Changing European Environment), we studied robo diseases from several points of view. Our most important aim was to understand the differences in human epidemiology in nephropathia epidemica, the most common hantaviral disease in Europe, caused by Puumala hantavirus (PUUV), between boreal and temperate Europe. We documented fundamental differences in the transmission dynamics of PUUV between these two biomes. The patterns in temperate zone are greatly affected by masting events, of which the frequency may increase due to warmer summers, while in the snowy boreal zone predator driven vole cycles shape the dynamics. Consequently, the underlying top-down or bottom-up causes of rodent fluctuations are different. We have further documented the role of landscape patterns (homogenous taiga vs. fragmented temperate forests) in rodent/virus dispersal, and in the presence or absence of host threshold densities for the PUUV occurrence. In addition, local environmental conditions (e.g., temperature and moisture) affect the virus survival outside the host, which may cause variation in indirect transmission. These results are essential for human risk evaluation with regard to both long-term and seasonal occurrence of PUUV in the environment. In conclusion, it is important to realize that within the same host/virus system, biome specific PUUV epidemiologies occur, which highlights the importance of geographically comparative studies in Europe.